

REMARKS

The Final Office Action dated July 22, 2010 has been received and carefully noted. The above amendments and the following remarks are being submitted as a full and complete response thereto. Claims 1, 4-6, 15 and 16 are pending. By this Amendment, Figure 1 is amended to show the conventional feature of a constant velocity joint, namely that the hub is axially secured to the shaft. The Specification has been amended to include an appropriate reference to the feature. Support for the amendments to Figure 1 can be found on at least page 12, line 25, to page 13, line 4, of the application as originally filed. Applicants respectfully submit that no new matter is presented herein.

Entry of Response Proper

Entry of this Amendment is proper under 37 C.F.R. §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issues requiring further search and/or consideration on the part of the Examiner as the Amendment merely responds to the Examiner's requirement that the claimed feature of the hub being axially secured to the shaft be shown in the drawings; (c) satisfy a requirement of form asserted in the previous Office Action; (d) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) place the application in better form for appeal, should an appeal be necessary. The Amendment is necessary and was not earlier presented because it is made in response to objections raised in the Final Rejection. Entry of the Amendment is thus respectfully requested.

Objection to the Drawings

The drawings are objected to under 37 CFR 1.83(a) for not showing every feature of the invention specified in the claims. The Applicants respectfully submit that Figure 1 has been amended to show the conventional feature of the hub being axially secured to the shaft. The Applicants respectfully submit that it is common knowledge in the art of automotive engineering that the hub and shaft must be axially secured with respect to one another in a constant velocity joint. For example, U.S. Patent No. 6,142,033 to Beigang discloses using a retaining ring 3 situated in annular grooves 6 and 8 and U.S. Patent No. 5,779,551 to Stall et al. discloses using a securing ring 12 to secure the hub 3 from axial movement with respect to the shaft 1. Moreover, the Applicants respectfully submit that the Specification as originally filed clearly indicates to persons skilled in the art that the Applicants were in possession of the conventional feature as claimed (see, e.g., page 12, line 25, to page 13, line 4). Thus, the Applicants respectfully submit that the detailed illustration of the conventional feature of axially securing the hub with respect to the shaft is not essential for a proper understanding of the invention and may be illustrated as shown in Figure 1, i.e., with a labeled representation. See 37 C.F.R. §1.83(a).

Applicants respectfully request withdrawal of the objection.

Objection to the Specification

The Specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. In particular, the Office Action asserts that every element recited in the claims must be described in the written description with reference characters regarding the drawings; or those features must be deleted from the claims.

The Applicants respectfully submit that Figure 1 has been amended to illustrate the conventional feature of the hub being axially secured to the shaft. Furthermore, the Specification has been amended as discussed above to reference the conventional feature illustrated in Figure 1.

Accordingly, the Applicants respectfully request withdrawal of the objection.

Claim Rejection – 35 U.S.C. § 112

Claims 1, 4-6, 15 and 16 is rejected under 35 U.S.C. § 112, first and second paragraphs, as failing to comply with the enablement requirement and for being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Office Action asserts that the feature of the hub being axially secured to the shaft is not described in the Specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention without undue experimentation. The Applicants respectfully disagree.

Since the combination between the hub and the shaft is a feature for transmitting torque to members mounted on each of the hub and the shaft, the hub and the shaft have to be supported (secured) on these members in any way. For instance, the present invention has the hub and the shaft serving as part of a constant velocity joint. The shaft comprises a power transmitting shaft, and the hub functions as an inner ring which has guide grooves receiving therein balls. See, e.g., page 12, lines 5-12, of the application as originally filed. As is well known to one of ordinary skill in the art, the hub must be axially secured to the shaft to prevent displacement in an axial direction of the shaft. For example, as discussed above, Beigang discloses using a retaining ring 3

situated in annular grooves 6 and 8 and Stall discloses using a securing ring 12 to secure the hub 3 from axial movement with respect to the shaft 1.

The Applicants respectfully note that it would not take undue experimentation on the part of one of ordinary skill in the art to axially secure the hub to the shaft. As noted above, the claimed feature is a conventional feature in the art. Moreover, the Applicants respectfully submit that the original disclosure fully supports that the Applicants had possession of the feature as claimed at the time of filing the application (see, e.g., page 12, line 25, to page 13, line 4, of the application as originally filed). Thus, the feature, as amended in the previous Response, is not new matter, is clearly and distinctly claimed, and is described in the Specification in such a way to enable one skilled in the art of automotive engineering to make and use the invention without undue experimentation.

Applicants respectfully request withdrawal of the rejection.

Claim Rejection -- 35 U.S.C. 103

Claims 1, 4-6, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,142,033 to Beigang in view of FR Patent No. 2,562,969 to Jacques. Applicants respectfully traverse the rejection.

As detailed in the previous Response filed April 28, 2010, Claim 1 recites a mechanism for transmitting torque between a shaft and a hub that includes, among other features, a hub axially secured to a shaft in a position disposed around the shaft, a shaft tooth section having shaft teeth formed on the shaft and a hub tooth section having hub teeth formed on the hub, wherein a first starting point of a first step region and a second starting point of a second step region are offset from each other in the axial direction of the shaft by a predetermined distance, and wherein the end of the

second portion and the end of the second peak portion are offset from each other in the axial direction of the shaft by a predetermined distance.

Beigang discloses a shaft/hub unit having a shaft 1 with shaft toothing 5 and a hub 2 with hub toothing 7, both sets of toothing engage one another. The tooth profile in Fig. 1 clearly illustrates that Beigang does not teach or suggest that the predetermined axial offsets between the first starting point of the first step region and the second starting point of the second step region and between the end of the second portion and the end of the second peak portion, as recited by Claim 1.

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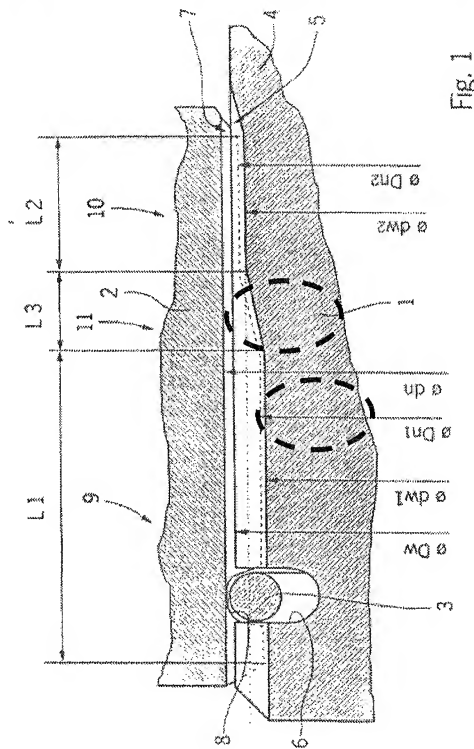


Fig. 1

As highlighted above in Fig. 1 of Beigang, the first starting point of the first step region of the shaft tooth section and the second starting point of the second step region

of the hub tooth section are aligned along the axial direction of the shaft 1, as are the end of the second portion and the end of the second peak portion. Beigang does not disclose, teach or suggest the predetermined axial offset features of the hub and shaft tooth sections recited in Claim 1. When the starting points of the step regions (slopes), for example, are aligned with each other as disclosed in Beigang, a stress concentrates in the shaft. In contrast, in the present invention, the starting points are offset and the stresses are distributed for increased static mechanical strength and fatigue strength. See the comparison data presented in Fig. 9 and the associated discussion describing the effects found on page 21, line 13, to page 22, line 6, of the Substitute Specification.

The previous Office Action dated December 28, 2009, on page 4, admits that Beigang fails to disclose “the first starting point of the first step region and the second starting point of the second step region being offset from each other in the axial direction of the shaft by a predetermined distance.” However, beginning with the last paragraph on page 4, the Office Action asserts that “given that the teeth on the shaft and the hub are free to move relative to each other, the first step region and the second step region could be offset from each other in the axial direction since a gap A3 is present between the two step regions and another gap A4 allows a ring 3 to move freely with the hub, the shaft, or vice versa. These gaps A3, A4 allows the hub to shift and thus making the step regions offset from each other. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to have the first step region be offset relative to the second step region in the axial direction due to these gaps being present.” The Applicants respectfully submit that the reasoning and interpretations applied by the Office Action as described above are not supported,

explicitly or implicitly, with respect to the disclosure of Beigang.

Rather, Beigang explicitly teaches away from the asserted interpretations. As shown in Figure 1, the shaft/hub unit of Beigang teaches three portions, a first portion 9, a second portion 10, and a portion of transition 11. In the first portion 9, the shaft toothing 5 has a base diameter $dw1$ and the hub toothing 7 has a major diameter $Dn1$. In the second portion 10, the shaft toothing 5 has a base diameter $dw2$ and the hub toothing 7 has a major diameter $Dn1$. Beigang teaches that the portions 9 and 10 have a specific longitudinal length $L1$ and $L2$, respectively, and that “[b]etween such portions 9, 10, there is positioned the portion of transition 11 having the length $L3$, in which portion 11 the base diameter of the shaft toothing 5 and the major diameter of the hub toothing 7, in the longitudinal direction, increase constantly from the first portion 9 to the second portion 10, with the base diameter, in the longitudinal direction, extending from the value $dw1$ to the value $dw2$ and with the major diameter of the hub toothing extending from the value $Dn1$ to the value $Dn2$.” See Col. 3, lines 29-62. In other words, because the longitudinal length for portions 9 and 10 are the same $L1$ and $L2$, respectively, for both the shaft toothing 5 and the hub toothing 7, as disclosed and shown clearly in Figure 1, Beigang teaches exact alignment of the various transition points and does not teach an offset. In fact, and absolutely contrary to the unsupported allegation of “another gap A4 [that] allows a ring 3 to move freely with the hub, the shaft, or vice versa,” Beigang specifically discloses that “[i]n the first portion 9, there are provided annular grooves 6, 8 which are engaged by the round retaining ring 3 for axially securing the hub 2 relative to the shaft 1.” See Col. 3, lines 62-64, and Claims 4 and 6-10. Nowhere in the disclosure does Beigang teach or suggest a gap A4 or that

the “teeth on the shaft and the hub are free to move relative to each other,” as asserted by the Office Action.

Moreover, Applicants respectively submit that “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.” See MPEP §2143.03. Accordingly, Applicants note that Claim 1 recites that the first starting point of the first step region and the second starting point of the second step region are offset from each other in the axial direction of the shaft by a predetermined distance. Assuming, for arguments sake only, that Beigang did teach a gap A4 (not admitted) that allowed axial slip of the shaft toothing relative to the hub toothing, contrary to the stated intent of Beigang, any resulting offset would be completely random and capricious, and certainly not predetermined.

Furthermore, and with regard to the Examiner’s comments in the interview summary dated April 23, 2010, the Applicants previously amended Claim 1 to recite that the hub is axially secured to the shaft in the position wherein the offsets are defined. As is well known in the art, retaining rings, for example, may be used to secure the hub to the shaft, ensuring a proper meshing of the hub and shaft teeth while preventing the hub from being released from the shaft (see page 12, line 27, to page 13, line 3, of the application as originally filed). Accordingly, the Applicants respectfully submit that the offsets of Claim 1 are not random and capricious, but predetermined and predictable based on the position in which the hub is axially secured to the shaft. For the reasons discussed above, the Applicants respectfully submit that the Examiner may not simply dismiss the conventional feature of Claim 1, wherein the hub is axially secured to the shaft.

Jacques is cited for teaching various other features of the present invention and Applicants respectfully submit that Jacques, alone or by any combination thereof, fails to cure the deficiencies in Beigang with respect to Claim 1. Applicants respectfully submit that Jacques, alone or by any combination, does not teach or suggest a mechanism for transmitting torque between a shaft and a hub that includes, among other features, a shaft and a hub, wherein the hub is axially secured to the shaft in a position disposed around the shaft while holding a shaft tooth section and a hub tooth section in engagement with each other, the shaft tooth section having shaft teeth formed on the shaft and the hub tooth section having hub teeth formed on the hub, wherein a first starting point of a first step region and a second starting point of a second step region are offset from each other in the axial direction of the shaft by a predetermined distance, and wherein the end of the second portion and the end of the second peak portion are offset from each other in the axial direction of the shaft by a predetermined distance.

Thus, Beigang and Jacques, alone or in any combination, do not teach or suggest the features of Claim 1. As such, the Applicants respectfully submit that one of ordinary skill in the art would not be motivated to modify Beigang and Jacques, individually or in any combination, since any modification would not arrive at the invention recited by Claim 1.

Applicants respectfully submit that the specific factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, (1966) have not been considered or properly applied in the Office Action. When rejecting claims under 35 U.S.C. §103, an Examiner bears an initial burden of presenting a *prima facie* case of obviousness. The

Applicants respectfully submit that the Office Action has not made a proper *prima facie* rejection under 35 U.S.C. §103(a), because the prior art references fail to teach or suggest the present invention as recited in Claim 1. Moreover, the prior art reference of Beigang does not teach or suggest, but specifically teaches away from, the Office Action's interpretations to justify the obviousness rejections.

For at least the reason(s) stated above, the Applicants respectfully submit that Beigang and Jacques do not render Claim 1 obvious. Accordingly, Claim 1 should be deemed allowable over Beigang and Jacques, and should also be deemed allowable over any combination of Beigang and Jacques.

Claims 4-6, and 15 depend from Claim 1. It is respectfully submitted that these dependent claims be deemed allowable for at least the same reason Claim 1 is allowable, as well as for the additional subject matter recited therein.

Withdrawal of the rejection is respectfully requested.

Conclusion

In view of the foregoing, Applicants respectfully request reconsideration of the application, withdrawal of the outstanding rejections, allowance of Claims 1, 4-6, 15 and 16, and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing attorney docket number 025416-00026.**

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'W.D. Doyle', is written over a horizontal line.

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Enclosure: Replacement Drawing Sheet (1)